positive or negative electrode with the ceramic particles produces a secondary battery of high capacity, with a particularly high rate of discharge. Similarly, by adding ceramic particles to the plates of the battery, the plate strength increases, enabling one of skill in the art to produce batteries with excellent life cycle characteristics.

Rejection Under 35 U.S.C. § 112, Second Paragraph

Claim 2 has been rejected under 35 U.S.C. § 112, second paragraph. Claim 2 has been appropriately amended.

Rejection Under 35 U.S.C. § 102(b)

Claims 1-3, 5, and 7-10 stand rejected under 35 U.S.C. § 102(b). Claims 3 and 9 have been cancelled.

The Examiner has rejected claim 1 under 35 U.S.C. § 102(b) as anticipated by Peled et al., WO 94/24715. It is respectfully submitted, however, that claim 1 is patentable over Peled et al. for the following reasons set forth below.

Peled et al., disclose a lithium polymer secondary battery with a positive and negative electrode. The battery uses a composite solid electrolyte containing polymers.

Applicants' invention as recited by claim 1, includes a feature which is neither disclosed nor suggested by the art of record, namely:

> ...gel polymer electrolyte composed of polymer and an organic electrolytic <u>solution</u> dissolving lithium salt,

This feature is described in applicants originally filed application at page 8, line 196. Thus, no new matter is added.

The Peled et al. reference neither expressly nor under principals of inherency discloses this limitation. As shown on page 1, second full paragraph, of the Peled et al. reference, Peled et al. discloses composite solid electrolytes containing polymers. The gel polymer electrolyte of claim 1 is different from Peled et al. because the feature of claim 1 is a mixture of polymer and electrolytic *solution* where Peled et al. uses a composite *solid*.

It is because applicants include gel polymer that enhancement of the ion conductivity is achieved. Such enhancement is not present in the prior art reference. Accordingly, applicants respectfully submit that the Peled et al. reference does not anticipate claim 1.

The Examiner has rejected claims 1, 2 and 4 under 35 U.S.C. § 102(b) as anticipated by JP 7-153495 (JP-'495). The rejection of claim 4 is obviated by its cancellation. The remaining claims are patentable over '495 for the reasons set forth below.

The JP-'495 reference discloses a lithium secondary battery containing, in the positive electrode, a ceramic not relating to charge and discharge. The electrolyte used therein is a non-aqueous electrolyte solution consisting of a mixed solution of ethylene carbonate and diethyl carbonate dissolving $LiPF_6$.

Applicants' invention as recited by claim 1, includes a feature which is neither disclosed nor suggested by the art of record, namely:

> ...a gel polymer electrolyte composed of polymer and an organic electrolytic solution dissolving lithium salt,

This feature is described in applicants originally filed application at page 8, line 196. Thus, no new matter is added.

The JP-'495 reference neither expressly nor under principals of inherency discloses this limitation. The JP-'495 reference discloses a lithium secondary

battery containing, in the positive electrode, a ceramic not relating to charge and discharge. However, the electrolyte used therein is a non-aqueous electrolyte solution consisting of a solution of ethylene carbonate and diethyl carbonate dissolving $LiPF_6$. Claims 1 and 2 recite a *polymer* and electrolyte to form a gel polymer electrolyte. This feature of a polymer in conjunction with an organic electrolyte is not disclosed in the cited reference.

It is because of the polymer and electrolyte of claims 1 and 2 that enhancement of the ion conductivity of the electrolyte is achieved. Such enhancement is not attainable by the prior art. Accordingly, applicants respectfully submit that the JP '495 reference does not anticipate claims 1 and 2.

Rejection Based on 35 U.S.C. § 103(a)

Claims 13-15 have been rejected under 35 U.S.C. § 103(a). The rejection to claim 14 has been obviated by the cancellation of the claim. It is respectfully submitted that the remaining claims 13 and 15 are patentable over the art of record for the reasons set forth below.

Applicants' invention, as recited in claim 13, includes a feature that is neither disclosed nor suggested by the art of record, namely:

> [Ceramic particles in proportions of] 0.01 to 10 parts by weight in100 parts by weight of active substance . . .

This feature is described in applicants originally filed application at page 8, line 188. Thus, no new matter is added.

In the present invention, as claimed in claim 13, the content of ceramic by weight is a critical feature. In other words, having a reduced amount of ceramic in at least one electrode is critical for the ion conductivity of least one or both electrodes. This permits greater discharge capacity per unit weight of ceramic in

one or both of the electrodes. For example, a maximum value of 2.6 mAh at 5 weight percent ceramic is achieved.

None of the prior art shows increased discharge capacity with reduced ceramic content.

Peled et al. does not disclose a ceramic content of 0.01 to 10 parts by weight and 100 parts by weight of active substance. Rather, the weight percentage of alumina in the negative electrode mixture in Peled et al. is at least 17.4%.

It is because the reduced ceramic content in the electrodes increasing ion conductivity of the electrodes that a greater discharge capacity is achieved.

Based on the above, claim 13 is not subject to rejection as obvious over Peled et al. Withdrawal of the rejection of claim 13 and 15 which depends upon claim 13, under 35 U.S.C. § 103 is respectfully requested.

Rejection Under 35 U.S.C. § 103

Claim 6, 11 and 12 have been rejected under 35 U.S.C. § 103 as being unpatentable over Peled et al. in view of Kawakami or Blonsky. The rejection to claim 6 has been obviated by the cancellation of the claim. It is respectfully submitted that the remaining claims 11 and 12 are patentable over the art of record for the reasons set forth below.

Kawakami discloses polyethylene oxide for use in a porous polymer film to prevent short circuits. Blonsky discloses the use of solvent gelling agents with high surface area to adsorb the liquid electrolyte such as silica and alumina.

Claims 11 and 12 include a feature that is neither disclosed nor suggested by the art of record, namely:

[ceramic particles in proportions] of 0.01 to 10 parts by weight contained in 100 parts by weight of the active substance.

As noted above, the present invention as claimed in claim 13, indicates the content of ceramic by weight in one or both electrodes is a critical feature. In other words, having a reduced amount of ceramic in at least one electrode is critical for the ion conductivity of one or both electrodes. The reduced ion conductivity leads to the greater discharge capacity per unit weight of ceramic in one or both of the electrodes. For example, the reduced amount of ceramic permits a maximum value of 2.6 mAh at 5 weight percent.

None of the prior art shows ceramic content of 0.01 to 10 parts by weight and 100 parts by weight active substance. Neither Kawakami nor Blonsky disclose a reduced ceramic content or a maximum discharge capacity of 2.6 mAh at 5 weight percent. Additionally, neither reference contains a disclosure nor suggestion to reduce the amount of ceramic content in the electrodes as required by claims 11 and 12.

It is because of the reduced ceramic content in the electrodes that greater discharge capacity per unit weight of ceramic in one or both of the electrodes exists. For example, a maximum value of 2.6 mAh at 5 weight percent ceramic is achieved. Furthermore, the plate containing the reduced ceramic content is higher in strength as compared to plates without ceramic. Based on the above, claims 11 and 12 are not subject to rejection as obvious over the references Kawakami or Blonsky in light of Peled et al. Withdrawal of the rejection of claims 11 and 12 under 35 U.S.C. § 103 is respectfully requested.

Summary

In view of the foregoing amendments and remarks this application is in a condition for allowance and applicants respectfully request early and favorable notification to that affect.

Respectfully Submitted,

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Dated: October 18, 1999

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The Assistant Commissioner for Patents is hereby authorized to charge payment to Deposit Account No. **18-0350** of any fees associated with this communication.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail, with sufficient postage, in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on:

October 18, 1999